

Remarks

Claims 1-40 are pending in this application. Claims 34-39 have been withdrawn as being directed toward a non-elected species. Claim 1 has been amended to specify that at least one of the reactant flows is stabilized and the gas line pressurized. Support for this amendment may be found, e.g., at page 4, line 31- page 5, line 5, page 15, lines 18-31 and original claims 17 and 19. Claim 15 has been amended to correct a typographical error. Claims 17 and 19 have been amended to reflect the amendment to claim 1. Claims 22 and 23 have been rewritten in independent form and claims 24-28, 32 and 33 have been amended to reflect these changes. Former claim 14 has been rewritten in independent form and added as claim 40.

Allowable Subject Matter

The indication of allowability of claims 17-20 and 22-33 if rewritten in independent form is gratefully acknowledged. Claims 22 and 23 have been rewritten in independent form. Claims 24-33 depend from claim 23 and are submitted to be allowable based on the amendment of that claim. Claim 1 has been amended to incorporate the subject matter of former claims 17 and 19. Applicants believe that claim 1 is allowable for at least the same reasons former claims 17 and 19 are allowable. An indication of allowance is respectfully requested for at least these claims in the next action.

Claim Objections

Claim 15 was objected to as being informal. Applicants have amended this claim to correct the informality, thereby obviating the objection.

Rejections Under 35 USC § 102

Claims 1, 2, 6-13, 15, 16 and 21 were rejected under 35 USC § 102(e) as being anticipated by Kori et al. US Patent No. 6,551,929 (“Kori”).

As discussed above, claim 1 has been rewritten to specify that “at least one of the boron-containing species and the tungsten containing precursor reactants is provided to the reaction chamber by stabilizing a flow of the reactant by diverting the flow to an exhaust port without passing through the reaction chamber; and then pressurizing a gas line leading to the reaction chamber by flowing the reactant to the gas line prior to allowing the reactant to enter the reaction chamber.”

As this feature is neither taught nor suggested in Kori, Applicants submit that claim 1 as amended is patentable over the reference. Dependent claims 2, 6-13, 15, 16 and 21 are allowable for at least this reason.

Rejections Under 35 USC § 103

Claims 3-5 and 14 were rejected under 35 USC § 103 as being unpatentable over Kori. As noted above, claim 1, from which these claims depend, has been amended to specify that the at least one of the reactant flows is stabilized and the gas line pressurized. Applicants thus believe that these claims are patentable for at least the reasons given with respect to claim 1 above.

New claim 40 incorporates the limitations of former claim 14, specifically that the boron layer has a thickness of between about 3 and 15 Angstroms. This aspect of the invention ensures that a limited amount of tungsten is formed in the subsequent step. As described in the specification, formation of the boron-containing layer is not self-limiting. Rather, the boron-containing species reacts on the substrate surface to decompose into a boron film or layer. The reaction can proceed as long as the substrate is continually exposed to boron-containing species. Depositing a boron layer of thickness of between about 3 and 15 Angstroms ensures that a limited amount of boron is available to react with the tungsten-containing precursor. Unlike deposition of self-limiting reactants on the substrate, dosage, exposure time and substrate temperatures must be adjusted to deposit between 3 and 15 Angstroms of boron on the substrate. (see the discussion at page 10, lines 12-33).

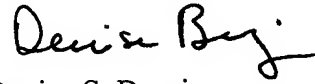
Kori, by contrast, appears to teach that the formation of the boron layer is self-limiting and flux-independent (col. 5, lines 55-61). Based on this teaching, one of skill in the art would not have realized the importance of the boron-layer thickness, nor of how to achieve it. The Examiner states that where patentability is based upon boron layer thickness, Applicants must show that this thickness is critical. Applicants have done so.

For at least these reasons, Applicants submit that claim 40 is patentable over Kori.

If any fees are due in connection with the filing this Amendment, the Commissioner is hereby authorized to charge such fees to Deposit Account 500388 (Order No. NOVLP096).

Respectfully submitted,

BEYER WEAVER & THOMAS, LLP

A handwritten signature in black ink, appearing to read "Denise Bergin". The signature is fluid and cursive, with a prominent initial "D" and a stylized "B".

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